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PETROLEUM.

THE GEOGRAPHY, CHEMISTRY, AND GEOLOGY OF MINERAL OILS.

In commencing a series of somewhat scientific letters upon the subject of petroleum, it will render clearer many subjects of which I propose to treat, if some explanation is given of the nature of mineral oils allied to petroleum, the mode of distilling them, and the different uses made of the various distillates.

The substance now generally known as petroleum was originally called, in the language of chemistry and mineralogy, naptha. It was thought to be the result of continued gentle heat upon coal or bitumen confined beneath overlaying masses of rock, and was regarded as the product of an ordinary distillation of the volatile matters of the coal, from its more solid parts. Accordingly, when various bituminous substances came to be subjected to a destructive distillation to obtain the benzole and other valuable substances contained in them, the general name of naptha was extended as to include almost all inflammable fluids obtained by distillation from organic matters. We shall briefly study the various napthas under the following heads:

1st. Naphtha from Cannel Coal.
2d. Naphtha from Coal tar.
3d. " " Wood.

NAPHTHA FROM CANNEL COAL.

In preparing the first, cannel coal is broken into small fragments, and heated in vertical or horizontal iron retorts. The tar passes through a worm made very wide so as not to become choked up by condensation of paraffine, and is received into large tanks. The tar so obtained is subjected to a second distillation, its valuable part is collected for illuminating purposes, the denser is applied to making lubricating oil.

Both portions, however, must be purified before they are adapted to their appropriate uses, and the process employed to effect this purification is the same in both cases. They are alternately treated with concentrated sulphuric acid to remove the highly colored and odorous constituents of the crude distillate, and washed with alkali to remove carbolic and cressylic acids. The alkali serves, moreover, to remove that portion of sulphuric acid which remains suspended in the naphtha and the sulphurous acid produced by the decomposition of the sulphuric acid by the carbon certain easily decomposed organic matters in the crude distillate. There is another advantage in the treatment of the fluid by alkalies, inasmuch as sulphide of hydrogen, and probably other foetid sulphur compounds are decomposed, and the resulting products removed. In order to improve still further the odor of these oils, and to remove their dark color, it is customary to expose them for several days to the light, by which this object is easily attained.

In order to prepare that portion which was set aside for lubricating purposes, it is run into a tank and heated by a steam pipe to about 150°. This causes the water and mechanically suspended impurities to separate. They are run off at the bottom, and the oil subjected to a further distillation. To each 100 gallons of this distillate, 10 gallons of commercial oil of vitriol are to be added, and the mixture stirred up thoroughly in a large leaden covered tank, provided with a revolving fan. The fluid is then allowed to rest for twelve hours, and the acid is drawn off from the bottom of the tank. Then four gallons of cautic soda are mixed with 100 gallons of this fluid so as to thoroughly neutralize any acid which has not settled out, and also to remove certain impurities which are capable of combining with it. After a new distillation and purification, the oil is found to be very rich in paraffine, and is used for lubricating purposes, either by itself or mixed with an animal or vegetable oil.

If it be desirable to separate the paraffine, it may be effected by cooling the oil prepared as above stated, down to a temperature of 30° or 40°. The lower the temperature the larger the amount which crystallizes out. The paraffine may be purified further by alternate treatments at about 15° with oil of vitrol and caustic soda. The treatments with acid are to be continued until the latter produces no more blackening. The solid paraffine is then to be washed with caustic soda until all acid is removed, and then with boiling water.

The crude oil obtained by distillation from cannel coal is b[illegible]eneous fluid. If it were so it would have a certain boiling point, and when heated to that point it would pass off gradually in vapor, while a thermometer immersed in the fluid would not manifest any elevation of temperature. But this is not the case, and we find that this crude oil is composed of fluids of about the same degree of volatility as commercial benzole, together with others, which distil at nearly the same temperature as common coal naphtha.

The first are free from solid bodies, and consists of a mixture of fluids composed of carbon and hydrogen combined in various proportions. Such combinations of carbon and hydrogen are called hydro-carbons, and of these hydro-carbons we have here presented to our view three series, which go by the names of the Benzole series, the Olefiant series, and the Alcoholic Radical series.

The benzole series are of importance as being the class from which aniline, the source of so many dyes, is obtained; the olefiant series interest us by accounting for the high illuminating power of these oils—olefiant gas being a large constituent of ordinary coal gas; the third series are at present only attractive to chemists. But the methods of obtaining these various bodies are so laborious, involving so many fractional distillations and consecutive treatments with different chemicals, that it is hardly worth while here to do more than to allude to their existence.

NAPHTHA FROM COAL TAR.

This is of especial interests at the present time, on account of its being the source of the benzole used in manufacturing coal tar colors. About a thousand gallons of coal tar are run into a large iron still, and after being twice distilled by steam, let into the interior of the vessel, yield what is termed "rough naphtha." This rough naphtha contains many impurities, and also some nitrogenous bodies, which impart to it a disgusting smell. In order to remove these the naphtha is mixed first with acid and then with alkali, in an agitator.

Coal tar is a mixture of acid, neutral, and basic bodies. The most important acid is carbolic acid, or phenol, which is a colorless fluid, with a powerful odor resembling creasote. It is said to have anaesthetic, disinfectant, and antiseptic properties, and to be an excellent fluid to use in grinding and polishing tools; but all these points are not very satisfactorily established. Of the basic substances, aniline is by far the most important; the others, such as pyridine, lutidine, chinoline, etc., have not as yet even been mentioned in common discourse, but the time is speedily coming when they too will be found fraught with as many valuable properties as their better-known congener, aniline.

The number of processes and patents which have been published relating to coal naphtha is immense. There is, as a general rule, an extreme sameness in them. Each inventor uses the processes of his predecessor, with some slight alteration or modification, and patents them as it involving an important discovery. It is true that in some few instances these alterations are very valuable, but the general feeling with which one rises from the perusal of patents connected with coal naphtha is, that there is nothing really new in them. All processes for their purification consist, essentially, of treatments with strong oil of vitriol, followed by alkalies. But the action of the sulphuric acid is by no means generally underatood, for if it were, we should see far more intelligence displayed in the methods by which it is proposed to get rid of the impurities contained in the coal tar. It is by no means uncommon to hear the workmen, and even those who have the direction of naphtha works, attribute the dark color which naphthas acquire, be contact with oil of vitriol to the latter, "precipitating out the tar." The fact is, that a carefully distilled naphtha does not contain any tar. The dark color is chiefly due to the removal of the hydro-carbons related to olefiant gas. All bodies like olefiant gas dissolve with a red color, as sulphuric acid, and the fluid on keeping soon begins to evolve sulphurous acid and turn dark, sometimes nearly black. These acts are of value in the purification of petroleum, and will go to show the correct method of employing acids in decolorizing the coal oil.

The benzole, which is the most volatile of all the constituents of coal tar, has been used for many purposes. One of them is perfectly familiar to every housekeeper. Benzole is invaluable as a means of removing spots and stains of grease from cotton, woolen, silk, and other fabrics; and in consequence of its volatility it leaves no mark or permanent odor. This property is of importance likewise in many industrial operations, as in removing the fatty matters existing in wood, cleaning hair, fur, feathers from oil, and cleansing gloves and other leathern articles. In order to remove the above matters by means of coal naphtha, the articles, if small, are merely rubbed with it. On the large scale the matters to be operated on are placed in suitable vessels, and the naphtha is run in. After contact for some hours the fluid is run off, and the fabrics are passed through squeezers and submitted to strong pressure to remove tha greater portion of the benzole or naphtha. The naphthas which run out are distilled off, so that the greasy matters may be preserved and used for lubricating machinery or other purposes.

DEVELOPMENT OF THE MANUFACTURE OF NAPHTHA.

It may be interesting at this point, after having detailed the various steps by which the manufacture of naphtha is carried on, to show how the demand for the products of the distillation of coal arose, and what cir

cumstances are likely hereafter to affect it. On the Continent of Europe there is not nearly so many animals slaughtered to supply food to the inhabitants as in our country. It is not customary there to furnish the breakfast-table with meat, as is the practice here, and even for the principle meal of the day the majority of the peasant population provide vegetables only.

For this reason there is not near so much fat thrown into the market as in England and America, and consequently it commands a much higher price. The denser the population, the less the quantity of meat which they provide for their tables. We all are familiar with the fact that early pioneers of the Western forests, who could capture abundance of wild game, and whose cattle could fatten on wide prairies, eat little vegetable food. The English with their verdant pastures enjoy an abundance of meat, while the inhabitants of the densely settled lands of Belgium and Holland have far less, and in China the only food to millions is their inexhaustible rice. Thus it happened that in Germany and France attention was directed to the bituminous schists and asphaltum to obtain an oil which might supply the place of animal oil. In the year 1820 Saussure subjected the asphaltic limestone found in Neufchatel to distillation, and obtained an oil from it which he describes as indentical with the petroleum found in the northern part of Italy. But to Reichenbach, the proprietor of some chemical works in Moravia, most of our knowledge of the oils to be obtained from coal is due. His results were so unsatisfactory, however, considered in a practical point of view, and so small an ammount of oil was obtained compared with the amount of coal subjected to distillation, that the attempts of experimentors in this direction were discouraged. The extensive use which was being made of the coal for the purpose of obtaining gaseous bodies from it, served to distract the attention of inventors from the liquids it contained, and it so happened that further investigations were suspended for several years. But, in the year 1850, James Young, of Manchester, succeeded in effecting, with advantage, the distillation of coal, by subjecting it to a lower temperature than had been previously applied, and manufactured large quantities of paraffine from the coal. In 1835, paraffine works were established in Germany, at Bonn, from a tertiary or brown coal from the neighborhood, and Toplitz, in Bohemia, and since that time its manufacture has increased in a corresponding proportion to its multiplied uses. It makes a beautiful white candle; it is a ready solvent for gutta-percha, India-rubber and some resins, and owing to its slight affinity for other substances, it has been used as a protective covering for iron and other objects against oxidation and corrosion.

Long before, however, the manufacture of paraffine from coal had thus been profitably established, even as far back as 1842, the oils obtained from bitumens and bituminous schists, had been extensively used in Germany and France. In countries lying on the sea-coast, like Great Britain and the United States, the abundant supply of fish oils retarded the manufacture of those to be obtained from bituminous substances; and though it had begun to be extensively developed, it has received a great check from the recent discoveries of petroleum in Pennsylvania. The latter is so much cheaper as a source of illumination, that while it is obtained with as much ease as at present, the distillation of bitumen for burning oils must be abandoned. As a source of benzole, however, and as a means of obtaining the splendid dyes now so extensively used in coloring silken and woollen goods, large quntities of coal are still consumed in England and on the Continent.—*U. S. R. R. and Mining Register.*

Striking Oil in Australia.—We learn that Oil has ...ck near Hartly, New South Wales, yielding ...nd forty of crude, or one hundred gallons ... company owning the property cal... roughly at work, to refine 20 ...eek, and supply consu... ...llon

MINING.

ANCIENT MINING.

Miners who work in the Spanish silver mine, known as the "White Pebble Pit," belonging for a long time to the Orfila family, have just made a discovery, which is alike interesting to art and archæology. Whilst digging their subterranean walks, they suddenly found themselves in passages, whose origin dates from the remotest centuries. They further discovered a thorough and scientific system of mining, the implements being in such a good state of preservation that it could be determined that it was not a Roman, but a Carthaginian or Phœnician mine. The hatchets, sieves for ore, but particularly a smelting furnace and two anvils, excite the interests of engineers in the highest degree. All these articles were carefully collected, and will enable scientific examinations to be prosecuted with greater exactitude than was possible after a merely superficial view. Particular attention will be paid to the remarkable instruments and objects of art which are said to fill the niches of a rotunda in the centre of the mine. This rotunda appears to have been the spot dedicated to the gods presiding over mines. It was occupied by three statues: one sitting down, and of half life size, and the other two standing, and about 3 ft. in height. These statues remind us neither of Roman nor Grecian art, but rather touch the style of that work of sculpture which was discovered in the year 1825 on the other side of the mountains, and which is now being preserved in the America, at Madrid, and is known as the "Carthaginian Hercules." The same symbols are found on a tripod and on a chest, which were leaning against the sides of the rotunda. Men of science were already excited by the discovery of 1854; the present one wil certainly throw a new light on the study of civilization once very mighty, but now almost extinct. The tools, implements, and objects of art at present form part of the cabinet of M. Lassary, of Valltdolid.

Atmospheric Ore Stamp.—An improved machine has been invented by Mr. Hughes, of New York, for the reduction of gold and silver ores to an impalpable powder, very simple in its construction, little liable to get out of repair, and easily repaired by an ordinary mechanic when necessary. The stamp used is but 75 lbs. weight, yet by atmospheric pressure the inventor claims that it strikes a 4,000 lb. blow, with the average rapidity of 200 blows per minute, of 400 with the two that are used in the machine. The piston (and stamp-head) is raised by a double cam on the main shaft, alternating the blows, which the patentee considers equivalent to a balance-wheel. It is thus raised, with a valve on the top of it, into an atmospheric chamber, thereby creating a vacuum under the valve, which gives such great momentum to the stamp when relieved from the upward motion of the cams as to produce the results above mentioned. The principle upon which it is constructed can be seen at a glance. The same principle can be applied as easily to any number of stamps as to two, and with equal facility it can be applied to the stamp-mills now in general use. Most practical millmen are firm in the conviction that the stamp system of reduction can never be bettered, and therefore never superseded. But, as at present constructed, they are large, costly, cumbersome, and difficult of transportation. The mill being small, compact, and portable, will prove of immense value to mines situated far from the seaboard.

Anthracite Coal as a Remedy.—Dr. Dyes (Dublin Med. Press,) recommends anthracite coal as an excellent remedy in cases of gastric and intestinal irritation, catarrh, or inflammation. He has given it in catarrh of the stomach, anorexia, cramps of the stomach, chronic jaundice, habitual constipation, hypochondriasis, anæmia, chlorosis, congestion of the spleen, following intermittent, typhus, scurvy, scrofula, etc., and intestinal worms.

The article must be very finely pulverized, and may be given in does of fifteen to thirty grains in the day in some convenient form.

MINING IN NEVADA, U. S.—OFFICIAL RETURNS.

The total number of tons extracted by the 24 companies producing ore was 99,733·1300, from which the gross returns were $3,171,728·89, or an average gross yield of $31·80 per ton. The largest returns are as follows:

	Tons.	Gross yield.	Per ton.
Felcher Co.	6,122	$275,930.00	$45·06
Gould and Curry	9,219	436,150·89	47·31
Savage	11,210	424,522·70	37·87
Yellow Jacket	21,785	642,657·50	29·50

The largest average return per ton was made by the Plato Mine, which gave a nett yield of $146 52 per ton on 303 tons of ore extracted. The returns for the quarter ending Sept. 30 will show a considerable diminution. Increased returns cannot be looked for until fresh bodies of ore shall be developed in depth by the new shafts which are being sunk. Pending fresh developments business continues very dull. The Hale and Norcross Mine, drifting south from their 700 feet level, recently found some good ore in the ground of the Chollar Potosi Company. This is at a depth of about 200 feet below the latter company's deepest workings. Every development tending to prove the continuance of the Comstock vein in depth is eagerly watched, and this exploration is the only one made in Virginia as yet, which presents any favourable features. In Gold Hill, the Imperial Mine have a splendid body of ore 700 feet from surface. All the other mines with the exception of these two, the Imperial and Chollar Potosi, are unproductive in their lowest levels. I have heard within the last few days that the Utah Mine, lying north of this place, has been sold to an English company. Nothing of any importance has ever been found here yet north of the Ophir. The Sierra Nevada, which lies between the Ophir and the Utah, has been steadily persevering for years, but as yet have been unrewarded by any permanent discovery. Still there is no reason why the Utah should not find ore in depth, but it will take time and money to do so. I hear that Major Ridge has taken charge of the Washoe Company's works in the Truckee, vice O'Connor, who has been displaced—none too soon, according to some accounts, but that may be open to explanation. This property, if well managed, cannot fail to become valuable, especially if the projected railway from this place to the Truckee is ever completed.—*Virginia City, Nevada*, Oct. 19.

NITRO-GLYCERINE.

The last number of "Le Genie Industriel" has an article by M. Alfred Nobel, engineer, setting forth at length, the advantages of nitro-glycerine over gunpowder for blasting rocks. The economy claimed is in the cost of drilling the rocks, as much smaller holes suffice, owing to the greater explosive force of nitro-glycerine. M. Nobel says that this force is in hard rocks from eight to ten times that of ordinary blasting powder, and in soft rocks from twenty to thirty times.

"Four principal causes contribute to its superior explosive force:—1st, its great specific gravity, which permits the introduction into a hole of nearly double the weight of powder which the same hole will receive; 2d, its perfect gasification, leaving no solid residue; 3d, its richness in oxygen, which produces complete combustion; 4th, its extraordinary suddenness of explosion.

"According to Regnault, gunpowder, in burning, forms, theoretically, 260 times its volume of gas, taken cold, but in practice, owing to incomplete combustion, it does not exceed 200 volumes.

"It is evident that gunpowder, the combustion of which is very incomplete, cannot produce an elevation of temperature so great as nitro-glycerine, of which all the carbon is transformed into carbonic acid, and all the hydrogen into water. This is proved in practice by the fact that a small addition of nitro-glycerine to powder communicates much more brilliancy to the flame. It is difficult to measure the heat of an explosive substance, but, in view of the above mentioned circumstance, it will be admitted that the temperature of

flame ought to be nearly double that of gunpower. We shall have then for powder 200 volumes, which, with a quadruple expansion, will be 800 volumes, and for nitro-glycerine 1,288—in round numbers 1,300 volumes—which, with an octuple expansion, will be 10,400."

Nitro-glycerine is made by dropping glycerine into a mixture of equal parts of strong nitric and sulphuric acids. It is a heavy oily liquid, its specific gravity being 1·6. It is insoluble in water, and the usual plan is to fill the hole above it with water in place of tamping, and then to fire it with a safety fuse, having a heavily charged percussion cap at its lower end. This mode of fireing has been patented in France and other countries.

According to M. Nobel, nitro-glycerine does not explode by direct fire, decomposing itself with flame by contact with an ignited body, but being extinguished so soon as the hot body is removed. He also says that it detonates under a violent blow of a hammer, but only the part that is struck explodes; the fire is not propagated to the surrounding portion. A few drops spread on an anvil may, by repeated blows, produce a series of explosions. By the gradual application of heat it explodes at 180° Cent.—356° Fah. It is a very permanent compound, preserving itself indefinitely, and not being decomposed by either phosphorous or potassium.

He does not understand how the sample, ten pounds, which exploded at the Wyoming Hotel, could have been ignited; but he has found that organic textures charred by sulphuric acid, will ignite nitro-glycerine, and thinks that may give a clue. If lighted by a match, it burns like oil; but if heated to 360° it explodes. It is less dangerous than gunpowder. Three hundred pounds were exploded close to a large building in Stockholm, and did little damage beyond breaking the glass.

GAS.

At Dundee Gas works, during a recent gale, the shaking of a gasometer which stands at the north east corner of an inclosure 20 ft. high, broke one of the pillars or supports, and the large mass tilted over to the east side, the lower rim being thus partly raised above the level of the water in which it floats, the gas inside escaped in large quantity, and became ignited; by what means is unknown. It immediately blazed up, of course, with great fury. The aperture between the water and the outer rim of the gasometer being of a nall size compared with the whole surface, the flame continued steadily for a considerable time. Had the gas escaped without immediate ignition, there might have been a terrible explosion. As it was, the flames rose to a height of fully 30 ft., and the heat was so intense as to melt the cement in the joinings of other three gasholders; so that the gas also escaped from them, and they were soon encircled with rings of flame, which burnt on till the gas was exhausted. The leaks at the joinings will have to be stopped; but beyond that the last three gasometers appeared to have suffered little or no injury. The first one, however, is much distorted at the filted side where the gas escaped.

An invention of Mr. W. Sim, of Glascow, has for its object principally to produce gas, so that it may be employed in places to which it is difficult to convey coal. One kind of apparatus for producing the gas consists of a vessel to hold mineral oil, from the bottom or sides of which tubes project, through which the oil is led by its gravitating power or otherwise. The falling drops are vaporized, and then conveyed through pipes in the ordinary manner. The oil may be vaporized in bulk instead of in drops, if preferred. The idea of this invention is by no means new.

COAL GAS EXPLOSIONS.

If sixteen parts of air be mixed with one of coal-gas, the mixture will explode feebly, and with little force; but if the proportions be gradually altered from sixteen parts of air and one of coal-gas, down to ten parts of air and one of coal-gas, the violence or explosive power of the mixture will be seen to increase gradually, until this latter mixture is reached, when the explosive power attains its maximum. If, now, we still go on diminishing the proportion of atmospheric air, we shall perceive that the explosive power of the mixture also diminishes until we reach a point at which two parts only of air are mixed with one of coal-gas when the power of explosion in the mixture ceases altogether, or becomes *nil*. Briefly, then, seventeen parts of atmospheric air and one of coal gas will neither explode nor burn; ten parts of air and one of gas will explode violently; and two parts of air and one of gas will burn, but will not explode; and within the range of these limits mixtures may be formed having any required degree of explosive force.—*Scientific American.*

ATMOSPHERIC FORGE HAMMER.

An improved and very efficient forge hammer is at present being manufactured by Messrs. Merril & Sons, of New York. The 10 lbs. hammer occupied but 4 feet by 2½ ft., and runs with but little noise, and no jar beyond the blow of the anvil or work. The cylinder and hammer move in vertical slides, so that each blow is square, and exactly in the same place; it is under the perfect control of the workman, who can strike light or heavy blows, and at any speed, and it is claimed that the working parts are not liable to get out of order. The hammer derives the increased force of its blows from compressed air. The cylinder is air-tight at each end, and there are two small holes in the side of the cylinder near the centre through which the air passes freely in and out. It will be noticed that the piston, piston-rod, and hammer are entirely independent of the cylinder, and can be moved up and down without moving the cylinder; also, that when the cylinder is moved either way the piston passes the air ports confining the air in either end of the cylinder, which prevents the piston striking either head, and acts as a spring, lifting the hammer up, or accelerating its downward movement. The cylinder has a definite motion, governed by the travel of the crank, but the hammer has more lift, owing to the compression of the air. If the cylinder is moved up and down slowly there is no blow given, as the weight of the hammer rests on the cushion of air, under the piston in the bottom of the cylinder. If the cylinder is moved up quickly the air under the piston strikes and lifts the hammer as quickly, and the momentum of the hammer in its upward motion causes the piston to pass the air ports, and compresses the air more or less according to the speed in the upper part of the cylinder; the elasticity of which, acting as a spring, accelerates the downward motion of the hammer, to which may be added the rapid downward motion of the cylinder following up and crowding the air spring upon the piston, adding to the force of the blow. The blow is controlled by the speed; the sharpest blow is given when run at high speed. It can be run rapid, and strike lightly by lengthening the connecting-rod, which allows the bottom cushion to receive the bulk of the blow. There are no valves to get out of order; the packing is exceedingly durable and easy working; both that in the piston and lower cylinder-head are made of the cup leathers used in packing hydraulic rams, and they have been run for months without perceptible wear.

IRON IN BRASS.

Dr. Crace Calvert, in a recent lecture, said:—Without occupying your time with further instances, let us call your attention to an important fact that Dr. Matthiessen, Mr. Johnson, and myself have observed, viz., that the addition of a small quantity of metal, which may be considered as an impurity, completely modifies, in many instances, its properties; and the most important example that I am acquainted with is the influence which the addition of one or two per cent. of iron exercises on the properties of brass. If a brass be composed of sixty per cent. copper and forty per cent. zinc, it will be susceptible of being drawn or bent when cold, but cannot be forged or worked when heated; while if 1·75 or 2 per cent. of iron be substituted for the same quantity of zinc, then a most valuable brass is obtained, for not only is this brass capable of being forged at a red heat, like iron, but its tenacity is increased in an enormous proportion, for each square inch of surface is able to support a "breaking weight" of from twenty-seven to twenty-eight tuns—a tenacity nearly equal to that of iron.

Messrs. Beyer & Peacock, of Manchester, who experimented with bolts made of this alloy, in the hope of substituting them for iron ones in the fire-boxes of locomotives, found that these bolts would support a strain equal to those of iron, and that the threads of the screw were not stripped with more facility than those of iron when exposed to the same strain.

TWO NEW LIGHTS.

The Italian journals announce the discovery of a new artificial light by Professor Carlevaris, of Genoa. The Carlevaris light is oxy-hydrogen-magnesian (not a costly substance) in a mixture of oxygen, either with pure hydrogen or with common gas. The light is described as white, rich in actinic rays, steady, and giving little heat. For photographic purposes it is said to be excellent. The light is said not to be effected by currents of air, and to be extremely cheap; a light equal to four composition candles is set down at two centimes per hour. An experiment was tried at the light-house of Genoa. The new light is reported to have proved superior to that of the ordinary lamps in use there, which represent twenty-three carcel lamps and to have cost not more than 3d. an hour.

M. Sayers, of Paris, has found that a brilliant light, possessing very high actinic power, is produced by the combustion of a mixture of twenty four parts of well dried, pulverized nitrate of potash with seven parts of flour of sulphur and six of the red sulphide of arsenic. This mixture can be sold at seven cents. a pound, and its light is, therefore, much cheaper than that of magnesium, to which it is said to be only very slightly inferior in actinic energy.

SOMETHING NEW—AN INK MINE.

A party has recently arrived at Los Angeles, from the vicinity of Buena Vista Lake and the oil springs there, having in his possession a bottle containing, according to the *News*, "a mineral substance very much resembling crude petroleum, but without any smell, and possessing all the qualities of a fine writing fluid. Several experiments were made by different persons, and all pronounced it a good quality of ink, or fluid, for writing. We dipped our pen in the fluid and wrote several lines, and could not distinguish the difference between it and the best writing fluid now in use. When first used the color is a deep, rich black, but after exposure to the air the color moderates a little, still retaining a good, and to all appearances, durable color. A company is being formed for the purpose of testing the above discovery."

Oil in Colorado.—The Denver News chronicles the finding of large quantities of oil in that State. It says: "We have every reason to believe from the indications and discoveries made, that portions of our Territory are as rich in petroleum as the celebrated Pithole District in Pennsylvynia. Near Canyon City a well is now yielding twenty-four barrels per day of the best quality of "green oil." This well is only seventy-five feet in depth, and is the only well that has been sunk for oil in the Territory. Some others are going down, but none have as yet reached any considerable depth.

Vegetable Electricity.—A Dr. Baronia, of Milan, who has been experimenting on electricity produced from vegetable substances, finds that a few alternations of slices of beet-root and walnut wood will set free electricity enough to excite convulsions in a frog, when conveyed to its muscles by means of a conductor formed of scurvy grass.

COAL GAS IN OUR GOLD MINES.

Dicker's Mining Record, of Melbourne, has the following:

The United Extended Band of Hope Gold Mining Company, Ballarrt, has lately, in addition to other improvements, initiated the use of gas in the underground workings of the mine. Mr. Bowman, of the Ballarat Gas Company, has furnished the following report—"Taking volume for volume, coal gas is only half the weight of atmospheric air. Hence it will always ascend if free to move, as may be seen by the ascension of balloons. There is no difficulty with gas, when it is conveyed from a low to an elevated situation, but when this condition is reversed, it becomes necessary to employ pressure to convey the gas downwards. This is usually done by confining the gas in vessels moving freely in water. When the water on the inside of these vessels remains two inches lower than on the outside, the gas is said to have two inches pressure. Under ordinary circumstances, this is sufficient for the lighting of towns, where the levels do not vary more than 100 ft. and would suit our gold mines if no greater depth is attained. But as the Band of Hope Mine is fully 400 ft. in depth, extra force is required to send gas down the shaft into the chamber, and along the main drive. This feat is accomplished by constructing a gas-holder a little heavier than usual, and driving the gas into it by means of a force pump worked by a small steam engine, not taxed beyond the three-hundredth part of a horse power This force is quite sufficient, as the gas, having a pressure of 6 in. on the surface, descends with greater velocity to the chamber, still retaining a pressure of 2 in. This would carry it through the workings, even if it were 3000 ft. from the shaft. The gas is at present only used for the chamber and main drive, but it will, probably, soon be extended through the whole mine. It was lighted on July 4 of this year, and has since required little or no attention."

Mr. Bowman adds, "A column of air 400 ft. in height is nearly the same weight as an equal column of water 6 in. high; so that a column of gas with 3 in. of water in it would balance a column of air. In practice it is usual to assume that the gas acquires an inch of pressure in every 100 ft. of elevation, and in sending it down a mine we give an inch of pressure to every hundred feet of depth." In England the first mine lighted with coal gas was the Machine Pit, Blackboy Colliery, near Bishop Aucland, about the year 1847, the gas conveyed from a gasometer on the surface. Many years before this the Felling Colliery, near Newcastle-on-Tyne, was lighted both above and below with carburetted hydrogen, from a drift in the Five Quarter seam, in which it was confined by a stone wall. In 1857 the first Cornish mine, the Ballaswiden United, was lighted with gas, which was carried down to the 110 fm. level by a pressure on the surface of about 7 lbs. to the square inch. The cost of lighting by gas was estimated at about half that of candle, while it economises the miners' time, and improved the ventillation. There is no doubt this mode of lighting would have been more generally adopted but for the prejudice of Cornish miners, as it is cheaper, cheerful, and illuminates the shaft, so that the pumps can be easily inspected. In the cases we have quoted the mode of conveying the gas to the various levels was by India-rubber tubing, lined with wire coil. The light can easily be moved about, or stuck in clay like the ordinary candle. We expect to see many other of our large mines shortly following the example of the Band of Hope.

Copper.—An extraordinary rise has taken place in the price of copper in France within the last few weeks, in consequence of the difference between Spain and Chili.

NEW ARTESIAN WELLS IN PARIS.

To the two artesian wells which Paris already possesses, a third is now being added—at the point called Butte aux Cailler, in the 13th arrondissement (Gobelins). The perforation has now reached the depth of 82 metres, being 20 1-2 metres below the level of the sea—but before reaching that point considerable difficulties have had to be overcome, in the shape of intermediate sheets of water, forming as it were, a series of subterranean lakes. The first of these was kept within its natural bed by means of a strong iron tube driven perpendicularly through it; that which followed received wooden palings, and the subsequent stratum being clay, the masonry was continued without difficulty to a depth of five metres above the level of the sea. But at this point a layer of anglomerations was reached, which let a great deal of water escape. It thus became necessary to have again recourse to pumps—those employed were, in the aggregate, of 20 horse power. Owing to the bad nature of this stratum it was resolved to protect the perforation by a revetment of extraordinary thickness—and in order that the well might preserve its diameter of 2 metres notwithstanding, the upper part has had to be widened in proportion, so as to give it the enormous width of 4 metres at the top. After this labor, the work of perforation was continued through a stratum of pyrolithic limestone. At the depth corresponding to the level of the sea, they reached a layer of tubular chalk, all pierced with large holes, forming so many spouts, as thick as a man's thigh, through which water poured into the well with incredible velocity. While the pumps were at work to get rid of this water, a cylindrical revetment of bricks was built on a sort of wheel made of oak, and laid down flat at the bottom of the perforation by way of a foundation, and the intermediate space between the cylinder and the chalk stratum was filled with concrete, 47,000 kilos. of which were expended in this operation. As soon as the concrete might be considered to have set, or attained sufficient consistency, the brick cylinder was taken to pieces again, and the perforation continued to the presure point, where a new sheet of water has been reached, requiring ingenious contrivances.

SINGULAR EFFECTS OF COAL OIL.

Under this heading the Virginia Enterprise recently chronicled a circumstance where a man in that city, in pouring a canful of oil from one can to another, and during the operation having occasion to regulate the stream by placing his thumb over a portion of the hole in the can from which he was pouring, found, on removing his thumb, that it was frozen stiff. The editor regards this as a very singular circumstance to be produced by oil, adding: "Had the fluid been ether there would have been nothing so strange about it, but kerosene is certainly not sufficiently valatile to have produced, by evaporation, so great a degree of cold in so short a time. It appears to us that here is a nut for some savans to crack. The freezing did not occur in the open air, but in a room comfortably warmed."

Our cotemporary is certainly mistaken in his conclusions. The freezing was most undoubtedly the result of a rapid evaporation of the more volatile portion of the oil. The heat of the room was more favorable for the result than a cold one would have been. The oil, very likely, was a very poor quality, containing an unusually large proportion of the most volatile substance that always accompanies in a greater or less quantity, all coal oil. The change of this liquid from a liquid to a gaseous state is so rapid that ice is often formed at the mouths of flowing wells, in the hottest summer weather. We are not at all surprised at such a result, as above described, under the circumstances indicated.

Discovery of Coal in Indiana.—Spencer County, Indiana, is enjoying an excitement about coal. Back of Grand View the hills are reported full of coal, superior in quality to any west of Pittsburgh. The Lafayette Journal says:—"A company has been formed in Cincinnati, with a capital of $300,000, which proposes to develop these mines to the fullest extent as soon as the machinery can be purchased and put in operation. The vein of coal the company proposes working is about five feet thick, and the coal of an excellent quality. The company also contemplates the immediate construction of a railroad from Grand View to the mines, for the purpose of delivering coal, in any quantity that may be desired, on the river bank.

Growth of American Cities:—In the year 1800 Cincinnati had but 400 inhabitants; in 1810 it had 2,540; in 1820, 9,602; in 1830, 24,851; in 1840, 46,338; in 1850, 115,436; in 1865, it had 230,000. In 1831, the city of Chicago had twelve families; it has now about 200,000 inhabitants. So late as 1850 there were but 40 miles of railway lines around Chicago; now 5,000 miles centre there; and in the one year 1865 the value of the commerce that passed over the St. Clair flats was 22,700,055*l*. In 1849 when organised as a territory, Minnesota had 4,000 inhabitants; by the census of 1860 it had 170,000. The growth of the cities of California and "Petrolia," (which now contribute 70,000,000 dollars to the internal revenue of the United States) are within the memories of young men and boys. The westward march has become a rush.

Car Brakes Operated by Electricity.—Mons. Achard, a French civil engineer, has invented a means of operating brakes, so that they can be immediately applied to all the wheels of a railroad train, by touching a small lever, which has the effect to break an electrick current, and thereby release the brakes which are then forced against the wheels by springs. If the locomotive breaks from the train, or any coupling breaks, the electric wire will also break and the detached cars will be stopped. This invention has been recommended to the Emperor Napoleon for the fifty thousand francs offered for the best application of the votalic pile.

SHIPMENTS OF LAKE SUPERIOR IRON ORE.

From Marquette for the Year 1865.

Company.	Gross Tons.
Jackson	43,379
Shipped to furnaces	15,910
Shipped from Escanaba	10,658
	69,947
Cleveland	35,681
Lake Superior	46,777
Pittsburg and Lake Angeline	20,151
Marquette	5,077
Washington	1,075
New York	437
New England	163
Total shipments in 1865	178,908
Total shipments in 1864	248,000
Decrease.	69,092.

Be neither lavish nor niggardly—of the two avoid the latter. A mean man is universally despised, but public favor is a stepping-stone to preferment; therefore, generous feelings should be cultivated.

GOLD AND SILVER.

In forty years, from 1790 to 1830, Mexico produced, according to the Mining Journal, about $32,000,000 worth of gold, and $699,000,000 of silver. Chili, $13,000,000 of gold and $91,000,000 of silver. Rusfia, $18,000,000 of gold, and $7,000,000 of silver. Buenos Ayres, $20,000,000 of gold, and $136,000,000 of silver. Total 1,016 millions of dollars, or $25,400,000 per annum. The London Engineer says silver was formerly found in such quantities in Spain, that, according to Pliny, Hanibal extracted a daily quantity equal in value to about $1,500 from a mine worked by him near Carthagena. Cato delivered into the Treasury 2.500 lbs. of silver in bars, and 120,000 in money, besides 400 lbs. of gold, all of which he accumulated in Spain. Helvetius, who was once Governor of Andalusia, delivered 37,000 lbs. of silver coin, and 40,000 lbs. in bars.

More than 500,000 oz of silver are annually obtained from British lead ores, by Pattison's process; and during 1864 there was obtained from five mines in Merionethshire 2,336 tons of auriferous quartz, which, when crushed by the amalgamating process, produced 2,837 oz. of gold, the value of which was nearly $50,000.

VEGETABLE IVORY.—Vegetable ivory shows a red stain where a drop of oil of vitriol is applied, which again disappears on washing it with water. Bone, or genuine ivory does not show this reaction.

AMMONIA AS A SUBSTITUTE FOR STEAM.

Quite an interest exists at present among French engineers, growing out of the late discussion of the proposition for the employment of ammoniacal gas for propelling carriages, and a patent for an ammonia engine has been taken out in the United States. The gas is condensed by cold, and the liquid ammonia thus prepared is put in a reservior, connected by a pipe and stop-cock with a working cylinder. At ordinary temperature of the atmosphere, the liquid expands into gas with great force, and when the cock is opened the gas rushes into the cylinder and works the piston in the same manner as steam. It is then condensed by water, for which it has a strong affinity. The quantity of liquid ammonia used in an hour as an equivalent to the power of one horse, does not exceed three gallons, weighing twenty-two pounds. The water used to absorb it is saved and the ammonia recovered and used over again. It has long been a favorite purpose of inventors to compress air so as to store up power in a form capable of easy transportation. This problem is solved by the application of liquid ammonia. Great things are expected from this invention.

CONDUCTING POWER OF METALS.—The relative conducting power of forged iron, steel, and cast-iron, are 436, 397 and 359, taking silver, which is the best conductor, at 1,000.

H. P. GENGEMBRE'S

PATENT

Non Freezing and Non Evaporating

METER FLUID,

☞ Far cheaper than any other in use. ☜

For Filling Wet Gas-Meters, cheaper, in the long run, than water.

Seven years of success!

Six years in general use in works using it, to the exclusion of all other fluid, and driving the dry meter out of use, enables us to recommend the patent with perfect confidence.

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The privilege of using the Patent has been granted in the following cities.

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THE KEROSENE OR PETROLEUM STOVE.

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THE

Ordinary Kerosene Oil,

SUCH AS IS

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HEAT ROOMS, BAKE, ROAST,

BOIL, FRY,

BROIL, STEW, AND

HEAT FLAT IRONS.

This is the ONLY STOVE, yet invented, which burns the common Kerosene, or Petroleum Oil, WITHOUT A WICK and is capable of doing all the COOKING, BAKING, WASHING and IRONING of a large family, as quickly as any coal or wood stove—is neat in appearance, and clean, MAKING NO DIRT OR ASHES—requires no room for stowing wood and coal, a light and portable, and may be used in any convenient place in or out of the house, and is guaranteed to be perfectly safe and free from explosion. This Stove must not be confounded with other Stoves offered under the name of Petroleum Stoves, which do not, and cannot, under any circumstances, burn the ordinary Kerosene, or Petroleum Oil, but burn Naptha, an article as dangerous as gunpowder, in the hands of persons unacquainted with its properties.

☞ This Stove may be seen in operation at the Office of the Petroleum Stove Co., 171 Broadway, Room 12, where Orders will be received, and State and County rights disposed of on liberal terms.

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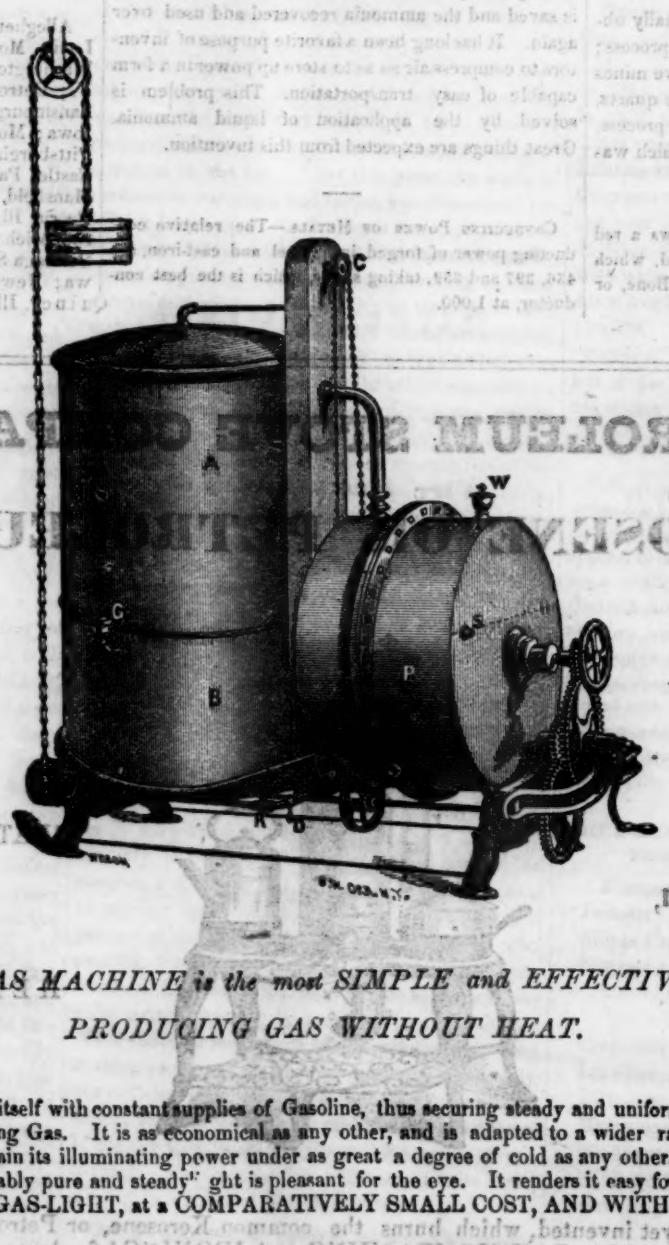
LEVI STEVENS' PATENT, FOR SUPPLYING,

Dwellings. Stores, Factories and Public Buildings.

THE GAS GENERATED BY THIS MACHINE

Is a mixture of the vapor of hydro-carbon with common air. The mechanical devices employed are such as, from a long experience and critical examination into the nature of the element brought into use, seem best adapted to secure a certain and satisfactory result. GASOLINE, the liquid employed, is the more volatile portions of Petroleum, of a specific gravity of 0.6587. This liquid exposed to the action of this machine is vaporized, and a close mechanical mixture of the vapor with common air is effected. The value of the gas produced, its permanency, its illuminating quality, and freedom from liability to condensation, depend almost entirely upon the perfect and uniform character of this mixture. Hence the great importance of mechanical means adapted to secure all the conditions requisite in a Portable Gas Machine.



CASH PRICE-LIST OF MACHINES COMPLETE;

(Boxed and delivered on the cars at the Manufactory.)

No. 1,	$150,	5	Argand Burners.
do. 2,	250,	10	do.
do. 3,	350,	20	do.
do. 4,	450,	35	do.
do. 5,	600,	60	do.
do. 6,	1,000,	125	do.
do. 7,	1,500,	250	do.

This machine will produce the most brilliant and steady light, without Fire or Heat, and is warranted to operate in every respect as represented.

The EMPIRE STATE GAS MACHINE is the most SIMPLE and EFFECTIVE MEANS KNOWN FOR PRODUCING GAS WITHOUT HEAT.

Its action is automatic, feeding itself with constant supplies of Gasoline, thus securing steady and uniform supplies of Gas. The gas produced is equal to the best known Illuminating Gas. It is as economical as any other, and is adapted to a wider range of use for Lighting, Heatin and Mechanical purposes. It will maintain its illuminating power under as great a degree of cold as any other. It is free from danger with the ordinary care in using gas. Its remarkably pure and steady light is pleasant for the eye. It renders it easy for persons living remote from street gas pipes to enjoy the luxury of a pure GAS-LIGHT, at a COMPARATIVELY SMALL COST, AND WITH LITTLE TROUBLE.

☞ The public are invited to witness its operations at our store. GASOLINE will be supplied by us, at market prices, or may be obtained from the various other sources of supply now going into operation.

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H. M. Bailey, Superintendant of Works.
J. Walter Clark, Accountant. J. M. Duclos, Arch.

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For Wet Meters, Gasoline Machines, Hydraulic Presses, &c.

We warrant our Glycerine free from acid and not to corrode the Meter metal, or to congeal or freeze at a stated temperature—also, not to evaporate to any extent. The advantages and savings derived from the use of our fluid can be testified by many Gas Light Companies which we have supplied. We only refer to the certificates of H. J. Miller, Esq., President of Cincinnati G. L. and Coke Co., and Dr. J. Lawrence Smith, Professor of Chemistry in the Louisville College, and President of the Louisville Gas Co.

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Office No. 71 Main street, Cincinnati —Chemical Works on Providence st, and Miami Canal, near Findlay st.

CERTIFICATE.

Office Louisville Gas Co., Louisville, June 28, 1865.
This is to certify, that the Louisville Gas Co. have used for about two years, the Glycerine prepared by Messrs. Hartman & Laist of Cincinnati, in their Wet Meters, and have in all instances found it to give most perfect satisfaction. Prior to the use of the above Glycerin, we had employed that manufactured by other parties, and we consider H. & L's superior to any we used.
J. LAWRENCE SMITH, President.

Office Cincinnati Gas Light and Coke Co., July 7, 1865.
This will certify, that Messrs. Hartman & Laist of Cincinnati, furnished this Company with Glycerin for Wet Meters some two years since. It has proved very satisfactory, having resisted the action of frost during two winters and evaporating not more than six per cent. per annum, as guaranteed by them. The standard being, for density, 15 deg Beaume's scale. They were the first to introduce it practically to this Company. H. J. MILLER, President.
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Gas Retorts, Tiles and Fire-Brick of all shapes and sizes.
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CHEAPER THAN COAL OR WOOD.
The "EAGLE" Gas Heating
STOVES,
Positively guaranteed free from Smoke or Smell.
Will Heat Offices, Parlors, Dining, Sleeping, and Bat Rooms. Also,
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The EAGLE GAS STOVES and RANGES have been in use for over Three years, and are found to be the most SIMPLE, COMPLETE and PERFECT Arrangment for HEATING and COOKING, in every respect ever invented, and to do the Work with LESS TROUBLE, in LESS TIME and at LESS EXPENSE than any Coal or Wood stove.
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No. 474 BROADWAY, N. Y.
☞ The Company have descriptive Catalogues, which will be sent or delivered, upon application for them.

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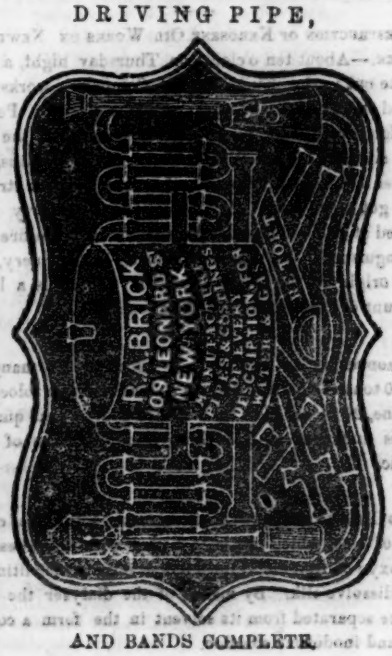

OFFICE 109 LEONARD STREET, NEW YORK.
AND BANDS COMPLETE.

THE MINING & PETROLEUM STANDARD AND AMERICAN GAS-LIGHT JOURNAL, is published at Tribune Buildings, No. 1 Spruce st. on the 2d and 16th of every month, and is a recognized official organ of—

LIGHT, HEAT, MINING INTERESTS,

PETROLEUM, WATER-SUPPLY, AND

SCIENTIFIC SUBJECTS GENERALLY.

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Prof. C. ELTON BUCK, Consulting Chemist.

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☞ All communications to be addressed to "The Editor," No 1 Spruce Street, New York.

AGENTS.

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Philadelphia—Jot, Cox & Co., No. 441 Chestnut st. cor. 5th.

Germany.....B. Westerman & Co., of New York.

Great Britain....Trubner & Co., 60 Paternoster Row, London.

France.....Le Journal de l'Eclairage au Gaz, 25 Boulevard Poissonnière.

The Mining and Petroleum Standard

AND

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 2D AND 16TH OF EVERY MONTH.

JAMES W. BRYANT, Editor.

FRIDAY, FEB. 16, 1866.

☞ *Private Office, No.* 111 *Pearl street.*

☞ *Agent's Office, No.* 1 *Spruce street.*

☞ Our subscribers would confer a favor upon us by remitting *checks, or Post Offices Money orders*, as we are frequent losers by money sent by mail.

☞ We should be pleased to make our journal an organ of intelligent discussion for those of our subscribers and readers who may wish to gain, or give information on the subjects to which our columns are devoted. We solicit letters from those who make the study of gas a pleasure as well as a profession.

Destruction of Kerosene Oil Works on Newtown Creek.—About ten o'clock on Thursday night, a fire broke out in the Kingsland Oil Company's works, situated on the west side of Newtown creek, near Penny Bridge, Greenpoint, L. I. In consequence of the distant situation of the Williamsburg fire apparatus, the flames had full sway about half an hour before a stream was got upon them. A destruction of property estimated at $25,000 therefore ensued before the fire was extinguished. Tee loss is principally in machinery, &c. The origin of the fire is unknown. There is a large amount of insurance upon the property.

Production of Aniline.—It requires as many as 2,000 tons of coal to produce a small circular block of aniline, 20 inches high by 9 inches wide. This quantity is sufficient to dye three hundred miles of silk fabric.

To Dissolve Silk.—A concentrated solution of chloride of zinc, which has been boiled with an excess of the oxyd of that metal until it does not discolor litimus will dissolve silk. By means of the dialyser the silk can be separated from its solvent in the form a colorless and inodorous solution.

THE EXPLOSION AT NINE ELMS.

Terre Haute, Jan. 25th, 1866.

Mr. Editor:

Dear Sir:—I have read with much interest your article from the *London Artizan*, giving an account of the disastrous calamity at Nine Elms.

There is no idea, in my opinion, advanced in the article, that successfully controverts the axiom of Gas Engineers, that a holder cannot explode, when there is nothing to prevent its freedom of action.

Your note, sufficiently proves that the article does not contain all the information or facts in the case.

From the description, we might infer, that the gasholders were in an enclosed building, as is frequently the case in the Eastern States,—as it says—"the mere burning of the gas in No. 1 gasholder, could not have blown out the roof, leaving the structure in the condition it was afterwards found," &c. Your note also says "the explosion did not take place in the gasholder; but by the accidental ignition of gas, which had escaped from it." Consequently it must have been in a building, as no external explosion could take place in the open air.

You say "the explosion did not take place in the gasholder," the article says, "the crown plates in gasholder No. 1, were blown outward," thus arguing an external explosion.

Now arises the query, how came the air into gasholder No. 1, so that an explosion could take place, whereby the crown plates could be blown outwards?

Before answering this, I would state the facts in reference to an explosion that did occur, which was in this wise:

A new mast gasholder had been in use but a few days; some difficulty occurred which prevented the free action of the holder, supposed to be between the ring post and the mast; the gas was shut off, until the cause of friction was ascertained and removed. An inch hole was cut in the man-hole plate to let the gas escape, for the double purpose of letting the holder settle on its base, and to ascertain and to remove the cause. Suddenly the obstruction gave way; it settled upon its base; this caused a partial vacuum, a current of external air rushed into the gasholder; at this moment, an ignorant employer applied a lighted match to the aperture, which carried in the flame and an explosion took place, raising the gasholder twenty or more feet.

Now, bearing these facts in mind, might not the same means which made the orifice in No. 1, which did not explode, have caused a larger opening in or near the top of No. 1, for the "Artizan" speaks "of the orifices already made in the side of No. 1 gasholder." These large openings would have permitted the gas to pass out more rapidly; let it down on its base, caused a partial vacuum, draw in the external air and the current of flame &c., and thus occasioned the internal explosion of the gasholder; for he says with truth—"when two bodies of the gases become thoroughly intermixed, in about the combining proportions, if a light be applied to them, instantaneous combustion throughout the mass will take place, producing an explosion of a very violent character."

Again, if air was pumped into No. 1 gasholder, by the exhauster, it is certainly fair to presume that the gas in No. 2, which was pumped in by the same exhauster, had its constituent elements or gases, in the same proportion; if so, why did it not explode on the flame igniting the gas in it, instead of burning quietly away as represented?

The writer admits, that in the ordinary mode of manufacturing gas without an exhauster, no air can be mixed with the gas, even when a leak occurs in a retort—for he says—"where it does so merely by its own pressure, of course no air can pass through along with it, for should a leak occur in the retort, or any of the communications between it and the holder, gas will escape therefrom by reason of its pressure. But, he goes on to say, in extensive works it is found that the amount of pressure necessary to force the gas through the various vessels, between the retorts and its point of distribution from the works, is so great as to be injurious, and therefore the retorts are relieved from that pressure, by pumping out the gas from them, (the retorts) into the holders by means of an exhauster."

Now I have seen several exhausters in operation; have examined their internal construction; but have never been practically brought in connection with them. What I wish to query is this:

Does the exhauster pump the gas out from the retort?

A correspondent on the gas question, who seems to be conversant in some degree with gas works, and tolerably well informed, at least, just enough to impose on the uninformed in these matters, who will not take the trouble to ascertain whether these statements are correct, nor thus discourses.

"The process can be seen at our City (Cincinnati) gas works, where an immense exhaust pump, driven by a steam engine, may be seen at work, sucking the gas from the retorts, almost into a vacuum, taking off from the gas all pressure, and reducing it into proper condition, if not to give light, at least to fill meters."—

Now in my opinion the exhauster does not act directly upon the retorts at all, it merely removes from the hydraulic main the gas which has ascended through the tar from the retorts, by the pressure of distillation, and being thus relieved of the excess of pressure above the tar, passes more freely through it, and thus the extra pressure in the retorts is removed, thereby preventing the excessive deposit of carbonaceous matter on the retorts, which the best authorities say is due almost entirely to the pressure on the gas, and that there is every reason to suspect that some of the very best constituents of the gas, namely, the volatile hydro-carburets, are decomposed and condensed in this deposit, and that the gas is thereby much impaired in quality. In addition to this, the pressure causes an increase in the quantity of tar, an effect which never takes place except at the expense of the gas.

Every one acquainted with gas works, is perfectly familiar with the fact that in every works, especially large ones, during the summer, there are always a number of ovens, which have no retorts set; the stand pipes are down; the straddle pipes open to the pressure of the atmospheric air, the hydraulic seal preventing its passage into the main. Again, four or six times every twenty-four hours, every bench is opened to be drawn and charged; on the removal of the lids, atmospheric air rushes in (each lid, being first carefully exploded before removal). Now is it not perfectly clear, that if the exhauster can draw the gas from the retorts, it can also suck the air through the open saddle pipes and open retorts, to such a degree as to view its illuminative qualities, and produce a very dangerous explosive compound for daily use in every household.

It therefore seems to me, that this prejudice against the exhauster, which we hear so much of in the daily Journals, whenever gas matters are questions of public speculation, is entirely unfounded; unless a contingency arise, such as the writer winds up his article with in the Artizan: A contingency, which would be almost immediately known, and cause the stoppage of the exhauster at the earliest moment practicable, before any great admixture of atmospheric air could take place, viz: "A leak on the suction side of the exhauster and the supply of gas should fall short.

Yours truly,

G. R.

Copper Rolling in the United States.—From the report of the eighth census, it appears that there are seven establishments in the United States for copper rolling. These establishments employ 413 hands, and have a capital invested of $2,470,000. The cost of material consumed by them is valued at $2,537,000—the cost of labor at $157,080; and the annual value of products for the year ending 1st of June, $3,198,767,

Atmospheric Pressure.—The body of an average sized man presents a surface of about 2,160 square inches, or 15 square feet, and consequently sustains at the sea level a total pressure of 34,400 lbs., or nearly fourteen tons and a half.

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New York, Feb. 15, 1866.

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Leave from pier No. 15 North River, (Liberty Street,) daily at 6 a. m. for Easton, Mauch Chunk, Williamsport, Wilkesbarre, Mahanoy City, &c. Mail train at 8 a. m. for Flemington, Epston, Water Gap, Scranton, Wilkesbarre, Great Bend, Pittston, Binghampton, &c., 9 a. m. Western Express for Easton, Allentown, Harrisburgh, Pittsburgh, and the West, with but one change of cars to Cincinnati or Chicago, and but two changes to St. Louis. 12 m. for Easton, Allentown, Mauch Chunk, Reading, Pottsville, Harrisburgh, &c. 4 p. m. for Easton, Scranton, Great Bend, Bethlehem, and Mauch Chunk. 5 p. m. for Somerville and Flemington. 6 p. m. Express Train for the Oil Region and Erie, via Mauch Chunk and Williamsport, daily, except Saturdays. 6·30 p. m. for Somerville. 7 p. m. for Somerville. 8 p. m. Western Express for Easton, Allentown, Reading, Harrisburg, Pittsburg, and the West Sleeping cars through from Jersey City to Pittsburg every evening.

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For Rahway, 7, and 10 a. m. and 12, 2, 3.20, 4.10, 5.10, 5.40, 7.10, and 12 p. m.

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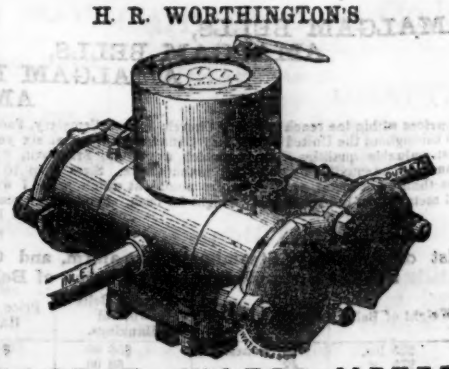

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1,000 "	64	250 00	42 00	292 00
1,200 "	48	300 00	45 00	345 00
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1,600 "	52	400 00	54 00	454 00
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2,000 "	58	500 00	62 00	562 00
2,500 "	60	625 00	72 00	697 00
3,000 "	63	750 00	85 00	835 00
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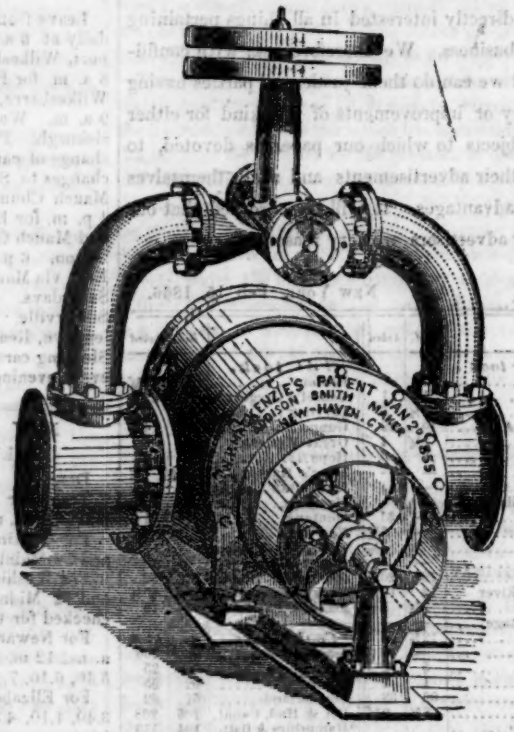

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J. De Peyster Ogden, Pres. L. Benton, Sc

RATHBONE OIL TRACT PET. CO.
69 Wall street. [$5,000,000.]
J. P. G. Foster, Pres. A. L. Purves, Sec.

RYND FARM PETROLEUM CO.,
8 Broad street, [$2,000,000.]
S. J. Macy, Pres. J. F. Jenkins, Sec.

SECOND NATIONAL PET. CO.,
100 Broadway. [$3,000,000.]
M. S. Frost, Prest. J. M. Bruce, Jr., Tr

TARR FARM PETROLEUM CO,
61 Cedar street. [$3,000,000.]
J. Wadsworth, Pres. C. W. Ware, Sec.

UNITED REPUBLIC PET. CO.
74 Broadway. [$2,500,000.]
E. J. Lowber, Pres. J. H. Kidder, Secy.

UNITED PETROLEUM FARMS CO.
10 Pine street. [$10,000,000.]
G. H. Bissell, Pres. J. P. Hogarth, Sec.

VIRGINIA & OHIO PETROLEUM CO.
51 Broad street. [$1,600,000.]
B. Schleffelin, Pres. E. Siebeer, Sc.

WINONA PETROLEUM CO.
5 William street. [$1,000,000.]
J. N. Tappan, Pres. J. D. Fish, Treas.

WEST VIRGINIA OIL & COAL CO.
71 Broadway, [$3,000,000.]
A. F. Bell, Pres. F. A. Miller, Se.

Great Improvement
IN
Sewing Machines.
EMPIRE
SHUTTLE MACHINE!

Patented February 14th, 1860.

Salesroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather o the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbert.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,
COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2 Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

T. J. McARTHUR & CO.,
536 Broadway.

WILCOX & GIBBS SEWING MACHINE

It is entirely noiseless.
A patented device prevents it being turned backward.
The needle cannot be set wrong.
It received the Gold Medal of the American stitute in 1863.
InSend for a circular containing full information, notices from the press, testimonials from those using the machine, &c.

JAMES WILLCOX,
Manufacturer, 508 Broadway, New York

Principal Offices:
NEW YORK—508 Broadway.
BOSTON—323 Washington street.
PHILADELPHIA—720 Chestnut street.
CHICAGO—133 Lake street.
CINCINNATI—70 West 4th street.
LONDON—135 Regent street.
HAMBURG—44 Hermann street.
PARIS—82 Boulevard de Sebastopol.
ST. PETERSBURGH—15 Gorochevay.
VIENNA—9 Wildpretmarket.
BRUSSELS—12 Rue Croisade.
SYDNEY, AUSTRALIA—292 Pitt street

GAS-BURNERS.

T. G. ARNOLD,
MANUFACTURER OF
GAS-BURNERS
And Importer of SCOTCH TIPS,
224 and 226 West 21st street,
formerly No. 447 BROOME St., New York.
Mercury Cups, Portable Sockets, Burner Pillars, Burner Pillers, &c., &c.

C. GEFRORER,
Manufacturer of
GAS-BURNERS,
For Lighting and Heating Purposes.
GAS HEATING AND COOKING APPARATUS; PITTERS' BOWING APPARATUS, &c.
529 Commerce st., bet. Market & Arch, Philadelphia.

WOODEN PURIFYING TRAYS
PATENT
Conically Slotted Solid Wood Sieves
FOR PURIFIERS.

The Conically Slotted Solid Wood Tray or sieve was patented 21st October, 1862, and all persons are cautioned against purchasing them of any other person except the subscriber. The following companies are now using these trays:

Manhattan, New York,
Metropolitan,
New York
Albany,
Troy
Brooklyn, L.
Williamsburgh,
Citizens
Baltimore Md.
Louisville, Ky.
Chicago, Ill
Cambridge,
And numerous others

Orders received by mail or otherwise.
JOHN L. CHEESMAN.
147 Avenue C New York City

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.
J. D. WEST & CO.,
No. 40 Cortland street,

JOSEPH LENNIG,
1615, 1617, and 1619 Francis St.,
Above Ridge Avenue, Philadelphia, Pa.,
MANUFACTURER OF
WET & DRY GAS METERS,
STATION, SHOW, & EXPERIMENTAL METERS,
Photometers, Pressure Registers, Indicators, and Gauges, Governors Meter Provers, Centre Seals, Fluid Gauges, &c.
GAS APPARATUS
Of the most reliable and approved construction manufactured and on hand at the
UNION GAS METER WORKS.

D. PARRISH, Jr.,
GAS ENGINEER
And Contractor for Coal or Oil Gas Works.
Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.
205 1-2 Walnut st., Philadelphia, Pa.
Box 1956, Post Office.

To Manufacturers of Petroleum Gas

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

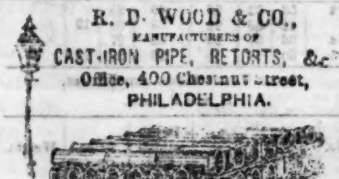
CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works
417 Walnut st., Philadelphia.

THE AUBIN GAS-WORKS COMPANY,
Of Albany, N. Y.,

Now contract their works to make 10,000 feet of good Gas from 2,000 pounds of *hard* wood and 40 gallons of kerosene tar, *before payment can be demanded;* and the charcoal is worth the cost of the wood.

Many Village Gas Companies can be referred to.

R. D. WOOD & CO.,
MANUFACTURERS OF
CAST-IRON PIPE, RETORTS, &c.
Office, 400 Chestnut street,
PHILADELPHIA.



Carrington & Co.'s
GENERAL
PURCHASING
AGENCY,
In Connection with all the Expresses
No. 30 Broadway,
NEW YORK.

Established 1854.

Purchases to order ANY article wanted from New-York, (or from Europe,) for ladies' or gentlemen's use or wear,—comfort or luxury—from a cameo to a cashmere—a sea ring to a steam-engine.

Goods purchased at current City prices, and forwarded by Express, or as directed.

Commission, Five Per Cent.

Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

SPECIAL CIRCULAR.

The Adams Express Company, appreciating the need of a capable medium connecting with the various Express Lines, through which personal and other orders for goods from this city, can be satisfactorily supplied, do recognize CARRINGTON & GENERAL PURCHASING AGENCY as such a medium for filling orders for every description of goods wanted from New York, and commend it to the attention of the public, and of our general and local agents, recommending our agents to extend to it all reasonable aid, by facilitating the distribution of its cards and circulars, and making known the advantages it affords.

ADAMS EXPRESS CO.
By W. B. DINSMORE, Prest.
NEW YORK, June, 1864.

We cheerfully concur in the above recommendation of the Adams Express Company.
AMERICAN EXPRESS COMPANY,
By HENRY WELLS, Prest.
UNITED STATES EXPRESS COMPANY,
By D. N. BARNEY, Prest.
WELLS, FARGO & CO.,
NATIONAL EXPRESS COMPANY,
By J. A. ELLEN
HARNDEN EXPRESS,
By H. W. WINCHESTER, Supt.
KINSLEY & CO.'S EXPRESS,
By E. LITTLEFIELD, Supt.
HOPE EXPRESS COMPANY,
A. D. HOPE, Supt.
BREESE & CO.'S EXPRESS,
By STEPHEN BREESE, Supt
NEW JERSEY EXPRESS COMPANY,
By GEORGE R. DUNN, Sup

The Greatest Improvement yet in the Sewing Machine Art!

A CURIOSITY WORTH SEEING!

Please send for circular with sample of sewing.

These Improved Machines SAVE ONE HUNDRED PER CENT. of thread and silk, and make the LOCK-STITCH alike on both sides.

They require no instruction to operate perfectly, except "the printed directions."

No change in sewing from one kind of goods to another.

And no taking apart to clean or oil.

Our NEW MANUFACTORY is now complete, with all its machinery and tools entirely new, and is already rapidly turning out Machines which for BEAUTY and PERFECTION of FINISH are not surpassed by any manufacture in the world.

N. B.—Should any Machine prove unsatisfactory, it can be returned and money refunded.

Agents wanted in counties not vassed by our own agents.

Finkle & Lyon S. M. Co.
No. 533 BROADWAY, NEW YORK

GROVESTEEN & CO.,

PIANO-FORTE MANUFACTURERS.

499 BROADWAY, NEW YORK.

The attention of the public and the trade is invited to our New Scale Seven Octave Rosewood Piano-Fortes, which for volume and purity of one are unrivalled by any hitherto offered in this marked. They contain all the modern improvements, French, grand action, harp pedal, iron frame, over-strung bass, etc., and each instrument being made under the personal supervision of Mr. J. H. Grovesteen, who has had a practical experience of over thirty years in their manufacture, is fully warranted in every particular.

THE "GROVESTEEN PIANO-FORTE"

Received the highest award of merit over all others at the Celebrated World's Fair!

where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvements we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES.

No. 1, Seven Octave, round corners, Rosewood Plain Case $275.
" 2, Seven Octave, round corners, Rosewood Heavy Moulding, $300
No. 3, Seven Octave, round corners, Rosewood Louis XIV. style $325, a fac-simile of the accompaning cut.

TERMS—NET CASH, IN CURRENT FUNDS. Descriptive Circular sent free.

LILLIE'S

CELEBRATED

Chilled and Wrought Iron Safes,

WROUGHT IRON FIRE-PROOFS,

LOCKS AND VAULT DOORS.

These Fire-Proofs are manufactured to supply a demand for Security Against Fire, less expensive than my celebrated and superior Chilled and Wrought Iron Burglar and Fire-Proof Safes.

They furnish similar and equal security to the Safes generally manufactured in the different cities, but are SUPERIOR to them in their Fire-Proof qualities and durability, the iron being effectually protected from rust in any climate, and the Fire-proof not subject to lose its utility by age. This is an important advantage gained to the purchaser, as Safes often rust out and become worthless in two or three years.

To substantiate my position, those purchasing these Fire-Proofs are at liberty, by giving me due notice of time and place of trial, to test them by fire with any other Safe of the same size; and should they not prove superior, I will refund the money, or a new Fire-Proof, as the purchaser may decide.

LIST OF SIZES & PRICES OF WROUGHT IRON FIRE-PROOFS

No.	Outside. Height.	Width.	Depth.	Inside. Height.	Width.	Depth.	Price.
6	42	31	27	31	21	15	$150
5	34	21	26	24	21	14	125
4	31	27	25	22	18	13	110
3	30	24	24	21	15	12	100
2	23	22	23	20	14	12	75
1	24	19	20	17	11	10	50

Sample of Fire-Proof Safe at Office of the Am. Ad. Agency, 389 Broadway, N. Y.

PRICE LIST.

LILLIE'S CELEBRATED CHILLED & WROUGHT IRON SAFES.

BANK, FIRE, AND BURGLAR SAFES.
Folding Doors, D Lock.

No.	Outside. Height.	Width.	Depth.	Inside. Height.	Width.	Depth.	Price.
	In.	In.	In.	In.	In.	In.	
1	66	50	29	54½	39	18	$950
1½	59	50	26	48	39	15	800
2	58	44	27	42½	33	16	660

MERCANTILE F AND H SAFES.
Folding Doors and Monitor Locks.

3	50	32	27	40	32	16	$500
4	46	42	27	36	32	16	450
4½	38	46	27	28	36	16	450
5	42	38	27	31½	27½	15	350

Single Doors and M. Lock.

6	38	30	26	27½	23½	15	$250
7	34	31	26	24	21	14	200
8	31	28	24	21	18	13	175
9	30	24	24	21	15	12	140
10	26	22	22	19½	18½	12	120
11	24	20	18	17	17	10	100

HOUSE SAFES.

SIDE BOARD	$600
DINING ROOM	350
PANTRY (No. 1)	275
PANTRY (No. 2)	150
DUODECAGON BANK LOCK	100
MONITOR SAFE do.	50
SAFE do.	10

NATIONAL BANK SAFES,
With 2 Inside Burglars and 1 D and 2 M Locks.

No.	Outside. Height.		Inside. Height.	Width.	Depth.	Price.
	In.		In.	In.	In.	
1	68		55	39	18	$1,200
2	61		48	39	18	1,050
3	57		42½	33	18	900

BANK VAULT BURGLAR SAFES,
With Folding Doors and D Lock.

0	68	53	27	64	43	20	$1,000
0½	61	53	27	55	46	20	800
1	57	47	27	49	40	20	600

BANK VAULT BURGLAR SAFES,
Single Doors and D Lock.

2	53	32	26	49	28		
	42	36	22	38	32	19	
4	36	31	20	32	27		0
5	30	24	18	26	20	14	

BANK VAULT DOORS AND FRAMES,
D and S Lock.

No.	Height clear.	Width clear.	Depth adjustable.	Price.	Weight.
	In.	In.	In.		
1	72	27	20	$400	2,000
2	72	23	20	275	1,500

Orders received and filled at net cash prices, by the AME[illegible] E VERTISING CY, 389 Broadway, New York. All Safes shipped from Troy free of cartage.
....[illegible] F. ALVORD *Corresponding* [illegible]

WEST'S IMPROVED PUMP.

Anti-Freezing, Double-Acting, Forcing, and Lifting

These Pumps have now been in general use a number of years, and give better satisfaction than any other, and are recommended as

THE BEST!

by CAPTAIN ERICSSON and other eminent engineers. We can refer to thousands using them, a guarantee that all will recommend them. They are more simple in construction, and work easie and cost less than all others.

"Our readers will find the double acting, improved pump of J. D. West & Co., one of the best the market. It is very simple, works to a charm, so that any child may use it; throws a steady continuous stream, and does not freeze in the coldest exposures, and is unusually cheap. We can this knowledgingly, and give the testimony of our own accord, without the knowledge or request of the proprietor."—*New York Evening Post, July 1st, 1863.*

"J. D. WEST & CO.: We are pleased to state that the Pumps we had of you about a year ago, have been in constant use, twelve hours each day, and raise for the use of our woolen factory, about 180 gallons per minute. They work with but little power, compared with pumps we have used before, and do not get out of repair, and are satisfactory in all respects.

"DUNLAP MANUFACTURING CO."

Solon Robinson to the Farmers' Club. Jan. 23.

"No farmer who owns a well or cistern can possibly afford to be without an iron pump.—It should be a once a suction and force pump—a perfect little fire engine—such a one known as 'West's Improved Pump.' I speak of this Pump because I happen to know it.....to be very simple, durable, powerful and cheap, and it don't freeze up, nor get out of order once a years...I know this, and think I may be doing the farmers good by speaking of it.....A boy ten years old can work it, and throw a continuous inch-and-a-quarter stream....It can be made to work in deep wells as well as in shallow ones."

"The undersigned having to use "West's Improved Pumps," cheerfully recommend them as simple, durable, and powerful in raising and throwing water, and for their ease of action, security against frost, and low price, we believe them superior to all others.

"WARREN LELAND, Met. Hotel, N. Y.
"J. W. POMEROY, Yonkers, N. Y.
"JOHN MESSEREAU, N. Y.
"DOMINICK LAWRENCE, Westchester."

From the New York Observer.

"We have had in use for months past one of West's Pumps, which has given us more satisfaction as a force and lifting pump than any we have ever used. It is one of great power, and well adapted for ship's decks, mines, factories, greenhouses, graperies, etc. *The Mining Chronicle and Railway Journal* says: 'It is recommended for its extreme simplicity of construction, great strength, and consequent durability and cheapness of repair. There is no stuffing-box—the pressure being held by a cup packing, like that upon the working-piston, fitted for the purpose within the upper air chamber—which we think a great improvement, as stuffing is so liable to be deranged and leak under strong pressure, to say nothing of the loss by friction incident thereto. It has also two air-chambers; thus the action of the valve is cushioned upon both sides by air—preventing water-hammer and vacuum-thump. The valves are very accessible and simply and cheaply repaired. They work much easier than any pump we have ever seen; the 4-inch cylinder being worked by children in wells 100 feet deep, and as they are extremely cheap, as well as simple and strong, we freely recommend them.'"

"CAMBRIDGE MINE, N. C., June 15, 1863.

"J. D. WEST & CO.—Gents: The Pump which I ordered for our mine is received, and put to work in our underlay shaft, which we are sinking. We find that one man will, with ease, lift 50 gallons per minute. We lifted in three and a half hours all the water in the shaft, which measures seven by twelve feet and thirty feet deep, and it was full when we commenced. It answers our expectations in every respect, and our workmen are highly pleased with it. It will do great service with but trifling expense for repairs.

"Yours, respectfully, BURR BIGGINS."

"This may certify, that I have been using, at my manufactory, for the last four years, 'West's Improved Pumps.' I now have in use three of said Pumps, one of which is kept constantly at work, 24 hours of each day (save Sunday, and has been running for the past two years. I pronounce them, unhesitatingly, the best Pumps that have been brought to my notice, having used many others previously. They are simple in their construction, and not easily disarranged.

"N. Y., Oct. 10, 1859. JAS. A. WEBB."

We have plenty more such certificates, but think these are enough. For Pumps, Hose, Pipe, etc., address or call upon

J. D. WEST & CO., 40 Cortlandt st., New York.

Orders may be sent through the AMERICAN ADVERTISING AGENCY, 389 Broadway

EDDY'S

Kerosene Cooking & Heating

STOVES AND RANGES.

THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

"We have been perfectly astonished to see what a labor-saving, dirt saving and heat-saving institution is EDDY'S PATENT KEROSENE STOVE. Taking the cost of running it, and the result attained, it is the best patent in the market."—*Worcester Daily Spy.*

Our Heating and Cooking Stoves are very convenient and economical, especially where a fire is required but a few hours at a time.

Orders for Stoves may be sent through American Advertising Agency, 389 Broadway, New York.

LESLEY & ELLIOT,

Manufacturers, No. 494 Broadway, New York.

Send for Illustrated Circular. (136

KNITTING MACHINES

FOR

Families and Manufacturers,

☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

Orders for Machines may be sent through the American Advertising Agency,

389 Broadway, N. Y.

Send for a Circular—Agents wanted.

DALTON KNITTING MACHINE CO.,

137] 537 Broadway, N. Y.

WEED'S

HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 20 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance, it Binds, Hems, Tucks and Sews on the band at the same time, and in face, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

Orders for Machines may be sent through the American Advertising Agency, 389 Broadway, N. Y.

Below we give a few prices:

No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
No. 2. Oil Black Walnut, Half Case, Ornamented, with Hemmer.	65,00
No. 3. Extra Oil Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

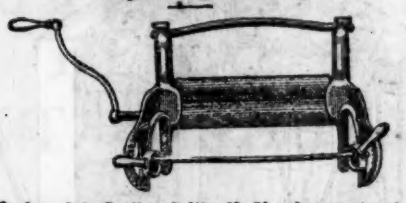
WEED SEWING MACAINE Co.,

26) 506 Broadway, New York

PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $5 to $10 per day.

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *not tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydise or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, 9, and $10.

Sample Wringers sent, express paid, on receipt of price.

Manufactured and sold, wholesale and retail, by

PUTNAM MANUF'G CO.,

18 PLATT STREET, New York,
BENNINGTON, Vt.,
CLEVELAND O.

WATER AND GAS PIPE.

The Boston Bituminized Pipe Company,

Are now manufacturing and prepared to take orders, for their PATENT PIPE, (from 2 to 12 inches in diameter,) as a substitute for Iron, Copper, Lead, &c., for the conveyance of WATER, GAS, SEWERAGE, &c. &c.

From the testimonials received, and the entire satisfaction it has given those having it in use, we feel warranted in claiming for this pipe over that of any other, the following advantages, viz:

It is much CHEAPER—has great strength (it having been tested to 500 lbs. to the square inch,) combined with LIGHTNESS, costing less for transportation; the joints are easily made and perfectly tight; it does not expand or contract from different degrees of tempera ture, and is free from *CORROSION* or *CONCRETIONS* forming; does not impart any taste or injurious properties to water, and as far as anything can be said to be indestructible, we deem this to be.

As a GAS PIPE, we say it has no superior. The Lowell Gas Light Co., purchased and laid some of this Pipe last year, and have likewise subjected samples to a test of four month's duration in their dry lime purifiers, with the most satisfactory results, in fact establishing beyond a doubt, its perfect adaptation to the wants and requirements of Gas Companies, specimens of which, together with the statement of E. Cushing, Esq., Agent Lowell Gas Light Co., who made these experiments, I shall be pleased to show, and give all other needed information, by applying in person, or by letter, to JOHN L. WEBSTER, Treas.,

Boston Bituminized Pipe Co.,
No. 2 Pearl st, House, Boston

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AMBROSE SPENCER GILCHRIST.

(LATE CAPT. U. S. V.,)

CIVIL, MINING

AND ARCHITECTURAL ENGINEER,

No. 200 BROADWAY, Office 12.

New York.

New York, April 18th, 1864.

• • • • • •

We respectfully invite your attention to and consideration of the justly celebrated and reliable remedy fo DYSPEPSIA, HEARTBURN, DEBILITY and PROSTRATION. The Proprietors are proud to acknowledge the unparalleled success which has attended the sale of their valuable preparation, known in nearly every portion of the civilized world as the

"GOLDEN BITTERS."

We risk nothing when we term them a *valuable preparation,* for they are one of the few articles of the present day which are not a humbug; and we are willing and able to satisfy any person or persons who will call upon us, that the celebrated "GOLDEN BITTERS" are a genuine *bona-fide hygienic* article. It is the wish of the proprietors that the virtue of the article be tested before condemning. A decision of their merits by any one who has tried them, is worth a million of purchased bogus testimonials.

For Creating a Healthy Appetite

they are invaluable, and are unequalled as a TONIC. They are mild in their action, and operate by giving *vigor* and *strength* to the system,—not by any change they produce in the solids, but through the medium of the living principle.

They are Purely Vegetable,

being composed of Gentian Root, Calamus, Sassafras, and many other remedial agents of the Vegetable world, all preserved in Jamaica Rum and Sherry Wine.

As a Beverage,

They are the most *wholesome, invigorating* and *palatable* stimulant ever offered to the public And the fact of their being prepared chemically and scientifically, precludes the possibility of a bitter, unpleasant taste, common to Bitters generally offered for sale. We especially recommend them to LADIES, and particularly to those suffering from

DEBILITY, WEAKNESS, AND PROSTRATION.

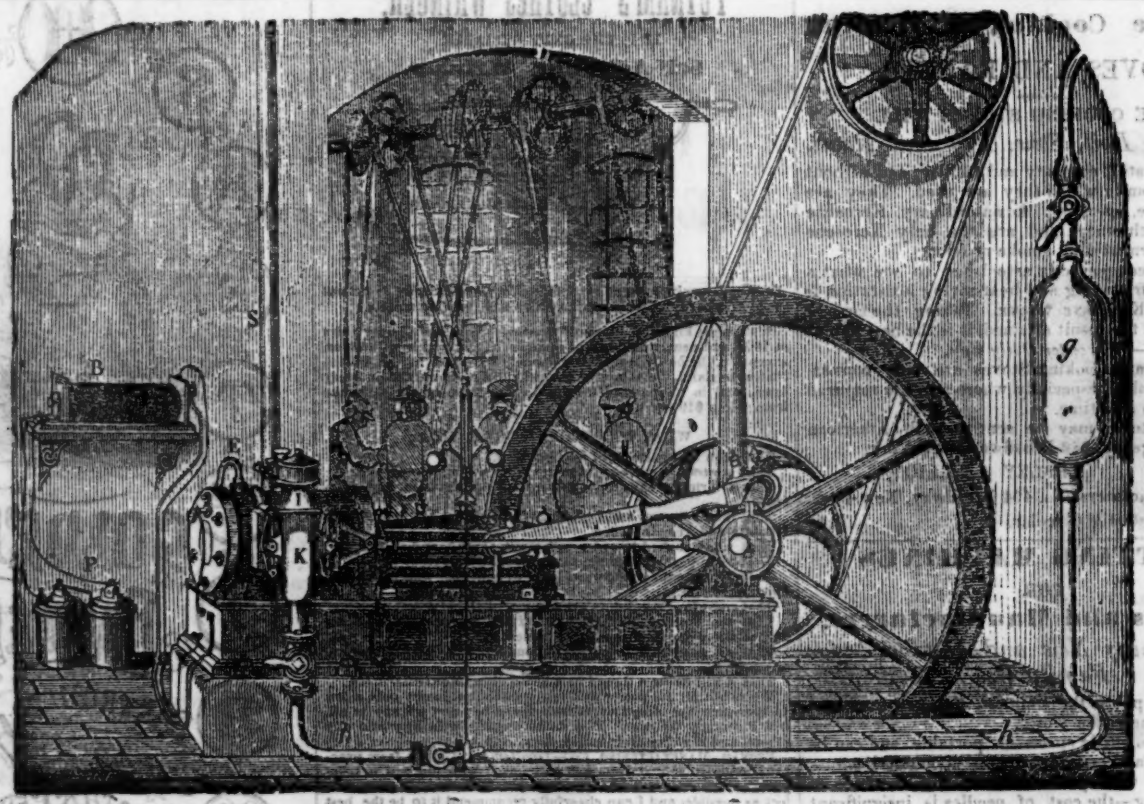
Half a wine glass of these "Bitters" three or four times a day, will produce a remarkable healthy change in persons greatly debilitated.

The "Golden Bitters" have been tried and not found wanting. They are put up in our own *Patent* quart bottles, and for sale by Druggists, Grocers, &c., throughout the world. Each bottle bears a fac-simile of the signature of Hubbel & Co.

GEO. C. HUBBEL & Co, Sole Proprietors

CENTRAL DEPOT, American Exp. Building, New York.

THE GOLDEN BITTERS.—We are not an advocate of stimulants or an alcoholic character; indeed we deprecate this "daily tonic" idea—this "morning toddy" which we see offered in all sorts of shapes as a recuperator, invigorator, revitalizer, &c. As a rule all artificial stimulants are dangerous remedies, and must be taken into the system as you would mercury or arsenic, in very small doses. But we have had an opportunity to try the now well-advertised article known as Hubbel's Golden Bitterz, and are frank to say that where the system needs building up, where a stimulant is required to aid nature in restoring a lost appetite and infusing a vigorous action to the debilitated functions, we can recommend these Bitters. Hubbel's Golden Bitters are evidently intended to improve the debilitated human system, rather than to tickle the palate, and are, therefore a harmless and safe remedy keep in the house.—*New York Weekly Day Book.*



MOTEUR—LENOIR.

LENOIR GAS ENGINE.

This is a horizontal engine, in which a piston, by a connecting rod drives a horizontal shaft.

The gas enters by the pipe "h" from the regulating reservoir "g," (made of vulcanized india rubber,) which regulates the feeding and the branches connected with the gas-pipe.

The tube, K, receives the gas conveyed by the pipe "h," and conducts it to the valve, which opens and closes alternately, by means of a rod moved by an eccentric wheel fastened to the end of the shaft.

Two of Bunsen's piles, P, sufficient to produce the electricity are placed at a little distanc from, and in communication with a Ruhmkorff electric apparatus, B. The electric current of this apparatus is conducted by means of insulated wires to the electricity distributor "m," placed on the front of the frame, while the current of electricity and its arrival at the inflammator, inserted at each end of the cylinder, is directed by the movement of the piston-rod, which, by an ingenious combination, impels a small movable slide before the distributor.

The burnt gas, after having performed its functions in the machine, escapes, by means of a valve, through a pipe, S, and the water designed to cool the interior of the cylinder enters through a double passage, by means of a pipe situated near the escape-valve, and goes out by the pipe, E.

A two horse and a half horse Engine are now in practical operation at the Dry Dock Iron Works, No. 435 East Tenth street, near East River, New York, where they are being manufactured, and those interested are invited to call and examine them.

THE LENOIR GAS ENGINE

Requires no Fire and makes no Smoke,

No Noise, no Dirt, and is thoroughly safe.

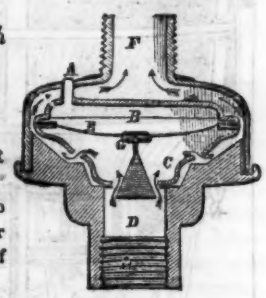
It is propelled by the expansion of Air, dilated by the combustion of Gas within the cylinder, ignited by the

ELECTRIC SPARK

NOTICE TO GAS COMPANIES AND GAS CONSUMER

THOMPSON'S PATENT GAS CONTROLLER,

The only Self-Acting Gas Controller, Regulator, and Burner Combined which has ever been invented, or known to science.



THE PRINCIPLE UPON WHICH THE THOMPSON'S AUTOMATIC GAS CONTROLLER works is one well known to mechanics, and is simple in its operation.

Within the circumference of a small cylinder below the burner is placed a conical valve attached to a movable diaphragm. The diaphragm rises or falls as the pressure of gas from the pipe is lesser or greater, and the valve acts upon the valve-seat with such regularity of movement that in a difference of om five-tenths of an inch pressure to five inches the variation in flame is hardly perceptible.

The simplicity of its machinery and the nature of the material used in its construction insure its regular action and durability.

In consequence of the uniform quantity of gas which passes the Controller to the burner, there is no waste, and a steady, soft flame is produced, which is important to all who read, write, or work by gas light. The unsteady flickering blaze which invariably exists when the pressure of gas is beyond the requisition for consumption, has injured the sight of thousands who have been subjected to it.

For street lamps these Controllers are especially valuable, because the pressure varies materially during the night, and in consequence there is a waste of gas, and the light variable.

Improvements have lately been made in the mechanism of the Controller which makes them almost a perfect meter to each burner, and they are now offered to he public with more confidence than ever before.

Reference is permitted to the following named gentlemen—

Col. CHAS. ROOME, President Manhattan Gas Company, N. Y.
C. H. SAND , Esq., President Metropolitan Gas Company, "
J. H. ADAM, Esq., President New York Gas Company, "
PETER COOPER, Esq., Cooper Institute, "
JOHN A. DUFF, Esq., Olympic Theatre, "

GEO. H. KITCHEN, Inspector of Gas Meters, N. Y.
A. L. BOGART, Esq., Gas Engineer.
Col. J. A. SABATTON, Engineer Manhattan Gas Company.
Col. A. J. WHITE, Engineer Metropolitan Gas Company.
J. K. SIMPSON, Esq., Engineer Cooper Institute.

Persons interested are invited to call at the Office, 111 Pearl street, where they can see the operation by pressure guage and test meters.

M. L CALLENDER, Agent
Office, 111 PEARL STREET.

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New York

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE PRESIDENT. RICHARD MERRIFIELD, SECRETARY AND TREASURER

TRUSTEES.

SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS & REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

West Twenty Second Street, New York. Arch and Twenty Second Streets, Philadelphia. *AMERICAN METER COMPANY,* No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore at their old Establishmen, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

WET AND DRY GAS METERS, and all kinds of GAS APPARATUS, and furnish all articles appertaining to the use of Gas Works. ☞OUR WORK WARRANTED—Satisfaction Guaranteed. Orders respectfully solicted, and promptly attended to, by
HARRIS & BRO., No 1117 Cherry st., Philadelphia.

Messrs. Harris & Brother,

Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000.

JOHN C. CRESSON, Engineer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1855.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G. S. HOOKEY, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia.

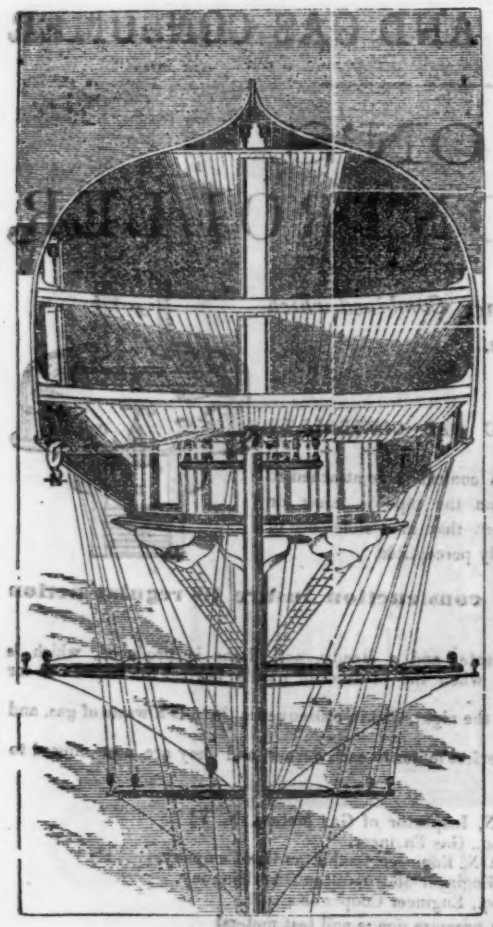
Philadelphia, March 4, 1858.

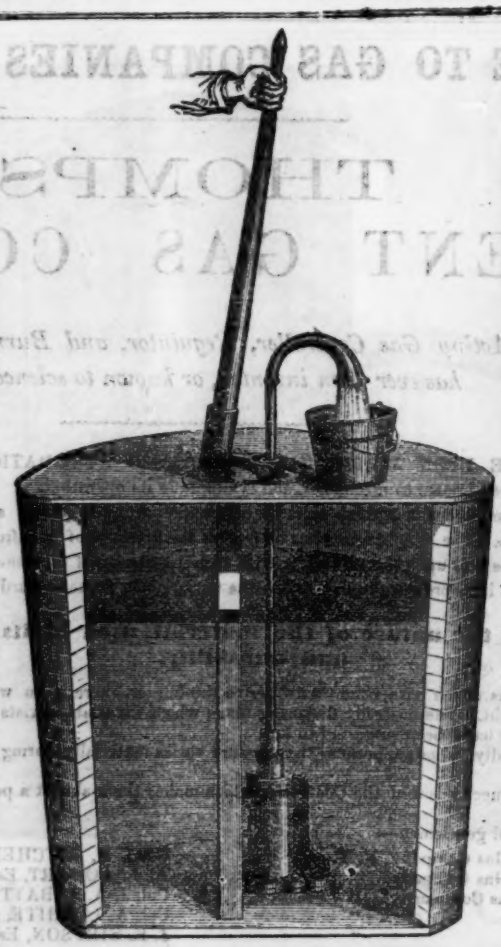
Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, BIRKINBINE & MEARS.

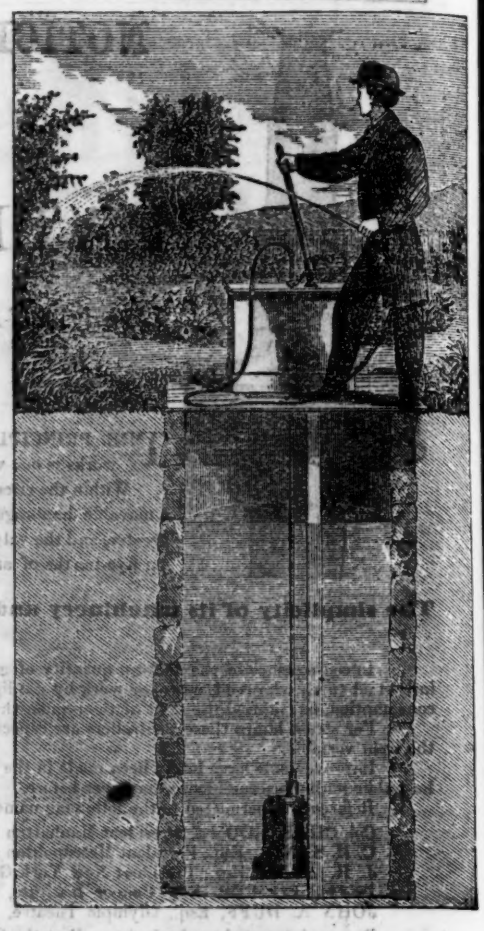
Messrs. Harris & Brother,

March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufacturers in the United States. Respectfully Yours, GEORGE WIEGAND, Inspector of Gas Fittings, Philadelhia.







THE AMERICAN SUBMERGED PUMP,

OWNED BY THE AMERICAN PUMP MANUFACTURING CO., NEW YORK.

OFFICE, No. 40 DEY STREET.

ITS ADVANTAGES.

This valuable Invention, now first introduced, will, it is believed, supersede all others for any purpose in use at the present time.

FIRST.—SIMPLICITY. The entire pump is composed of but six parts, all of cast-iron, which can be put together by any mechanic.

SECOND.—DURABILITY. From the fact that it is always submerged, it is perfectly lubricated, and requires no packing. As no water can remain in the pipe when not in motion, there is no danger of freezing.

THIRD.—CAPACITY. It is contended that, for the power applied, this Pump excels all others. The No. 1 (the smallest size,) of this Pump, with the power of one hand, has a capacity of thirty gallons per minute, and will throw a stream seventy feet in the air.

FOURTH.—CHEAPNESS. For economy, this Pump surpasses all others, its first cost being about one-third less than that of other Pumps of the same capacity, and being much less both in size and weight, there is a great saving in transportation.

ITS USES.

FIRST.—For a House Pump; the smallest size of the patent Submerged Pump is sufficient for all family purposes. Placed in a well or cistern, water may be conveyed to every room in a common sized house.

SECOND.—For a Farm Pump; for all purposes connected with irrigating, watering stock, etc., etc. This Pump can be placed in running streams, ponds, bayous, etc., and water conveyed to any required distance.

THIRD.—For a Ship Pump; Any ship owner or captain, with short experience in the use of this Pump, will give his unqualified approval for ship purposes, either to be used as a bilge pump simply, or for washing decks, etc. From its simplicity, as a bilge Pump it will be found entirely free from choking, and will clear grain, dirt, stones, etc., with ease.

FOURTH.—For a Factory Pump, or for air in Oil Wells, for Breweries, or for pumping acids, hot liquors, etc., it is invaluable. It cannot be affected by any liquid.

FIFTH.—To all Directors and Officers connected with mining interests, the PATENT SUBMERGED PUMP presents great advantages.

The experience of the last five years have clearly proved at what great expense, both in first cost and freight, it has been necessary to be at to secure the proper means of expelling water from the mines, quarries, etc. With this Pump an immense saving is effected in both instances, as in first cost it is much less than other Pumps of the same capacity and power.

Its principle is that of a Double-acting Force Pump, with a heavy double-acting piston cast in one piece, and a double-acting iron valve within the same, without the use of leather valves or any packing whatever.

RECOMMENDATIONS.

Office of the American Ship Building Company, New York, Oct. 21, 1864.

I am very much pleased with the economy and simplicity of the American Pump, which I have examined with much interest. IT IS ADMIRABLY ADAPTED FOR SHIP PURPOSES, and from its GREAT POWER would do incalculable service in the event of LEAKAGE. It also works well in pumping, where the cargo consists of grain in bulk, and is free in its action.

AUGUSTUS WALKER, Marine Constructor.

New York, October 26, 1864.

To the American Pump Manufacturing Co.:

I have examined with much interest the working and results of the Double Action Force Pump which you are introducing in the market. For use as a Ship Pump and for Mining purposes, I consider it of great value, the results far exceeding anything of the kind presented to my observation, particularly for its GREAT POWER and SIMPLICITY. It will give me pleasure to recommend its introduction into the Navy. Please deliver as soon as possible the Pumps ordered by me last week, for the Mines of the Middlefield Fire and Building Stone Company of Massachusetts, and oblige. Yours, respectfully, CHARLES B. STUART, Consulting Engineer, U. S. N.

Office of the Neptune Iron Works, New York, February 6, 1865.

the American Pump Manufacturing Co.:

I was very much impressed in examining the Pump manufactured by your Company. The originality of the design is in good keeping with its simplicity of construction—certainly very desirable qualities in all mechanical combinations. The extensive demand is the best proof of the popularity and favor it is receiving from the public. I have no hesitancy in recommending it to the inspection of those wishing THE BEST PUMP in the country.

CHARLES HUBBARD, Jr.,
Superintendent.

Office of Donald McKay,
East Boston, Aug. 15, 1865.

Alvin Walker, Esq., Sec. American Submerged Pump Co

DEAR SIR:—In answer to your request for my opinion of your Patent Submerged Pump, will say, that for simplicity, compactness and durability, it has the appearance of being the BEST mechanical combination I have seen, having fitness combined with its simplicity, making it SUPERIOR to Pumps now generally used for general purposes on land. Also, well suited as a Ship Deck Pump, and, in my opinion, can be arranged to be readily used as a good Bilge Pump for Ships.

Yours truly,
HERMAN WINTER

CAMP PAROLE, ANNAPOLIS, Md., April 22, 1865.

Wm. Numson, Esq., President, Baltimore:

DEAR SIR,—The No. 2 Pump has been properly adjusted, and works to our entire satisfaction. Hoping you may be successful in introducing it to the public, we remain,

Very respectfully, yours, &c.,
JONES & CROWLEY.

(Letter from the President of Board of Common Council, City of Boston)

Boston, August 10, 1865.

A. Walker, Esq., Sec. American Submerged Pump Co.—

Dear Sir—In reply to your request for the results of the trial of one of your Pumps, I will briefly state the purpose for which it was needed, and the complete satisfaction attained. It was desired to clean out a well 42 feet in depth, in which there stood 10 feet of water; I had previously vainly tried several methods, in one of which one large Force Pump and as many buckets as could be used, succeeded in 10 hours in reducing the depth of the water to 9 feet, but beyond that nothing could be gained. I then put in one of your smallest Pumps, which drained the well completely in Six Hours; although the spring which fed the well yielded a stream of water about as large as a man's arm. I need not say that I consider the Pump fully capable of accomplishing what you claim for it. Yours truly, W. B. [illegible]

[illegible]

MAR 10, 1866.